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Committee on New and Renewable Sources of Energy and on Energy for Development

Report on the second session
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NOTE

Symbols of United Nations documents are composed of capital letters combined with figures.

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Chapter I

MATTERS CALLING FOR ACTION BY THE ECONOMIC AND SOCIAL COUNCIL OR BROUGHT TO ITS ATTENTION

A. Draft resolutions

1. The Committee on New and Renewable Sources of Energy and on Energy for Development recommends to the Economic and Social Council the adoption of the following draft resolutions:

DRAFT RESOLUTION I

Proposal for a United Nations conference on energy for the twenty-first century*

The Economic and Social Council,

Considering the crucial role of energy in economic and social development and environmentally sound development,

Noting the continuing need for enhancing energy supplies and improving the living conditions in developing countries,

Recognizing the need to evolve strategies and programmes to ensure a sustainable regime of energy supply and consumption in the twenty-first century,

1. Invites Member States and entities within the United Nations system to consider convening a United Nations conference on energy for the twenty-first century in the year 2001, on the twentieth anniversary of the United Nations Conference on New and Renewable Sources of Energy, held at Nairobi, to mobilize world opinion for supporting actions at different levels on energy in relation to sustainable development;

2. Requests the Secretary-General to prepare a report examining the feasibility and the scope of the proposed conference, in consultation with experts, as necessary, and to submit the report to the General Assembly for consideration at its fifty-second session.

DRAFT RESOLUTION II

Coordination of the activities of the organizations of the United Nations system in the field of energy*

The Economic and Social Council,

Taking note of the view expressed by the Committee on New and Renewable Sources of Energy and on Energy for Development concerning the lack of a holistic and concerted approach among the organizations and bodies of the United Nations system to the assessment, development, utilization and management of energy resources,

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* For the discussion, see chap. IV.

Bearing in mind the recommendation of the Committee on New and Renewable Sources of Energy and on Energy for Development at its first session to study in-depth ways and means of strengthening institutional arrangements within the United Nations system in the field of energy, including the possible establishment of a dedicated institution, in order to significantly advance energy for sustainable development,

1. Requests the Secretary-General to study the possibilities of strengthening the coordination of the organizations and bodies of the United Nations system in the field of energy by the Administrative Committee on Coordination;

2. Further requests the Secretary-General, in consultation with the regional commissions and other entities within the United Nations system, to study ways to enhance the capability of the system in the field of energy for sustainable development, including the possibility of establishing a dedicated institution or expanding the mandate of an existing institution in order to meet this objective.

B. Draft decisions

2. The Committee on New and Renewable Sources of Energy and on Energy for Development recommends to the Economic and Social Council the adoption of the following draft decisions:

DRAFT DECISION I

Recommendations of the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session*

The Economic and Social Council takes note of the recommendations made by the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session, and invites all States, entities within the United Nations system, other international organizations and non-governmental organizations to consider the recommendations, as appropriate. The recommendations are as follows:

(a) There is an imperative need to accelerate the research into and development of all promising approaches to energy and materials efficiency and renewable energy development with a view to assisting in the early commercialization of advances made and achieving a more efficient and sustainable balance in national energy economies. International financing organizations are urged to consider earmarking a higher portion of their funds for this purpose;

(b) In view of the slow progress made in removing the barriers that hamper renewable energy development, there is a need to adopt a proactive approach towards removing such obstacles. In particular, there is a need to continue subsidies and other forms of direct and indirect support. The external costs of using fossil fuels need to be internalized, and a policy environment conducive to the use of renewable energy resources needs to be created;

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* For the discussion, see chaps. II, III and IV.

(c) A major and immediate expansion and acceleration is necessary in decentralized rural electrification programmes in developing countries. As recommended at the special session of the Committee, a global initiative should be launched with a clear commitment of financial resources to fund it and an agreed time-frame for its implementation;

(d) Taking into account the critical socio-economic situation in many developing countries, regional initiatives should be undertaken to resolve important issues related to the use and development of energy resources. Such initiatives should serve as a platform for studying, coordinating and implementing activities on a continuous basis, and could be further reinforced through other forms of international cooperation;

(e) A systematic database should be established on the programmes and activities of the organizations and bodies of the United Nations system in the field of energy in a form that is accessible for public information, using modern electronic communication techniques;

(f) The reports of the Committee should be made available to the Commission on Sustainable Development, the United Nations Centre on Human Settlements and the Conference of Parties to the United Nations Framework Convention on Climate Change for their consideration, as appropriate.

DRAFT DECISION II

Report of the Committee on New and Renewable Sources of Energy and on Energy for Development on its second session and provisional agenda and documentation for the third session of the Committee*

The Economic and Social Council:

(a) Takes note with appreciation of the report of the Committee on New and Renewable Sources of Energy and on Energy for Development on its second session;

(b) Approves the provisional agenda and documentation for the third session of the Committee set out below.

PROVISIONAL AGENDA FOR THE THIRD SESSION OF THE COMMITTEE ON NEW AND RENEWABLE SOURCES OF ENERGY AND ON ENERGY FOR DEVELOPMENT

1. Election of officers.

2. Adoption of the agenda and organization of work.

3. Follow-up to the previous sessions of the Committee.

Documentation

Report of the Secretary-General on the follow-up to the previous sessions of the Committee

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* For the discussion, see chaps. VI and VII.

4. Energy and sustainable development:

(a) Environmentally sound and efficient fossil energy technologies;

(b) Renewable sources of energy, with special emphasis on wind energy;

(c) Development and implementation of rural energy policies;

(d) Energy and transportation.

Documentation

Report of the Secretary-General on environmentally sound and efficient fossil energy technologies

Report of the Secretary-General on renewable sources of energy, with special emphasis on wind energy

Report of the Secretary-General on development and implementation of rural energy policies

Report of the Secretary-General on energy and transportation

5. Medium-term planning and coordination in energy.

Documentation

Report of the Secretary-General on coordination in energy

6. Proposed United Nations conference on energy for the twenty-first century.

Documentation

Report of the Secretary-General on action taken concerning the proposed United Nations conference on energy for the twenty-first century

7. Other matters.

8. Provisional agenda for the fourth session of the Committee.

9. Adoption of the report of the Committee on its third session.

C. Decision brought to the attention of the Council

Decision 2/1. Documents before the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session

3. The following decision adopted by the Committee on New and Renewable Sources of Energy and on Energy for Development is brought to the attention of the Economic and Social Council:

The Committee on New and Renewable Sources of Energy and on Energy for Development takes note of the following documents:

Report of the Secretary-General on the follow-up to the first and special sessions of the Committee (E/C.13/1996/2);

Report of the Secretary-General on energy exploration and development trends in developing countries (E/C.13/1996/3);

Report of the Secretary-General on renewable sources of energy, with special emphasis on biomass: progress and policies (E/C.13/1996/CRP.1);

Report of the Secretary-General on efficient use of energy and materials: progress and policies (E/C.13/1996/CRP.3);

Report of the Secretary-General on energy and protection of the atmosphere (E/C.13/1996/CRP.2);

Report of the Secretary-General on energy activities of the United Nations system (E/C.13/1996/7).

Chapter II

FOLLOW-UP TO THE FIRST AND SPECIAL SESSIONS OF THE COMMITTEE

1. The Committee considered agenda item 3 at its 1st, 2nd and 11th meetings, on 12 and 23 February 1996. The Committee had before it the report of the Secretary-General on follow-up to the first and special sessions of the Committee (E/C.13/1996/2).

2. At the 1st meeting, on 12 February, the Director of the Division for Sustainable Development, Department for Policy Coordination and Sustainable Development of the United Nations Secretariat, made an introductory statement.

3. At the same meeting, the Chairman, Mr. E. V. R. Sastry (India), made a statement.

4. Also at the same meeting, statements were made by Mr. W. C. Turkenburg, Mr. B. Devin and Mr. D. B. Volfberg.

5. At the same meeting, the representative of the International Research and Training Institute for the Advancement of Women made a statement.

6. At the 2nd meeting, on 12 February, a presentation was made by Mr. B. Devin on the results of an international seminar on the theme "Decentralized rural electrification" (Marrakech, Morocco, November 1995).

7. At the same meeting, statements were made by Mr. W. C. Turkenburg, Mr. B. Devin, Mr. D. B. Volfberg and Mr. J. L. Bozzo.

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8. In its resolution 46/235 of 13 April 1992, the General Assembly had established the Committee on New and Renewable Sources of Energy and Energy for Development, with a mandate to provide policy options and recommendations to the Economic and Social Council. The Committee had assumed the mandate of the former Committee on the Development and Utilization of New and Renewable Sources of Energy, including the consideration of the relationship between energy and environment and development. The Committee had also assumed the mandate of the former Committee on Natural Resources pertaining to energy. Finally, since the adoption of Agenda 21 by the General Assembly, the mandate of the Committee had included energy in relation to sustainable development as defined in Agenda 21.

9. At its first session (New York, 7-18 February 1994), the Committee had considered various issues pertaining to energy and sustainable development, and had made a number of recommendations to the Economic and Social Council for action at the national and international levels. 1/ In its decision 1994/311 of 3 November 1994, the Council had reaffirmed the importance of the continuing work conducted by the Committee, had taken note with appreciation of the recommendations contained in the report of the Committee on its first session, and had invited Member States to consider those recommendations, as appropriate.

10. The Council had also decided, in its decision 1994/309, that the Committee should hold a session in February/March 1995 for 10 days in order to provide

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1/ See Official Records of the Economic and Social Council, 1994, Supplement No. 5 (E/1994/25), chap. I.

advice on energy for rural development to the Commission on Sustainable Development at its third session, as provided for in Agenda 21. Accordingly, the report of the special session of the Committee, which had been held from 6 to 17 February 1995, had been transmitted to the Commission. Among other things, the Committee had invited the Commission to recommend that Governments that did not have national plans of action for sustainable agriculture and rural development should review the energy situation of their rural areas and formulate and launch the implementation of such plans, paying special attention to the effective use of biomass as a source of energy. The Committee had also addressed a number of recommendations to the organizations and bodies of the United Nations system concerning the launching of global initiatives to bring electric power to people in rural and isolated areas, achieve detailed mapping of the potential of renewable energy resources, and establish a network of centres of excellence. Finally, the Committee had recommended that the United Nations carry out an in-depth study of ways and means of strengthening institutional arrangements within the United Nations system.

11. On the basis of those recommendations, at its third session the Commission had encouraged Governments to integrate action on energy into their efforts for sustainable agriculture and rural development, and had urged Governments to support and facilitate the efforts of interested developing countries in their transition towards the sustainable use of an appropriate combination of fossil and renewable sources of energy for rural communities, taking note of the recommendations of the Committee.

12. The Committee noted that a number of countries had acted on the advice that it had provided at its first session, as endorsed by the Commission. As to action by the organizations and bodies of the United Nations system, the Committee noted with satisfaction that the World Meteorological Organization (WMO) had initiated capacity-building activities in member countries as a first step towards meeting the recommendations of the Committee in support of the preparation of national and regional assessments of renewable energy resources, in particular with regard to the preparation of continental-scale solar and wind energy potential maps for Africa. The Committee also noted the World Bank World Solar Initiative, as well as efforts undertaken by the United Nations Development Programme (UNDP) and other organizations for the promotion of the sustainable development and use of energy in rural areas, as recommended by the Committee. The Committee further noted the efforts undertaken by organizations and bodies of the United Nations system, such as the Department for Development Support and Management Services of the United Nations Secretariat, to implement its recommendation at its first session concerning the establishment of centres of excellence for new and renewable sources of energy. The Committee was concerned that progress in that regard had been severely hampered by an insufficiency of financial resources made available for the purpose, and in some cases by institutional weaknesses in developing countries that were interested in the establishment of such centres.

13. In connection with the work of the Committee and as a contribution to the Commission on Sustainable Development in its deliberations, a seminar on the theme "Decentralized rural electrification" had been jointly organized in Marrakech by the Governments of France and Morocco, with the support of the European Commission, UNDP, the Institut de l'énergie des pays ayant en commun l'usage du français (IEPF) and member countries of the European Union. The seminar had focused on issues related to the urgent need to change the pace and scale of the delivery of electrification to rural areas in order to provide electricity to the 2 billion people living in rural areas within the next 50 years. The participants from developing countries had issued a declaration

of a political nature in which they had expressed their strong desire to maintain contacts in order to pursue an exchange of experiences on a regular basis. The members of the Committee noted with appreciation the recommendations of the seminar that had been addressed to the Commission on Sustainable Development and to other key actors in rural development programmes to guide them in their formulation of large and medium-scale decentralized rural electrification schemes.

14. The Committee wished to emphasize the importance of according their due priority in the development process to energy resources issues. Given that it was the only body within the United Nations system that dealt with all aspects of energy in a holistic manner, the Committee felt that its substantive deliberations could provide valuable inputs to the Economic and Social Council, the General Assembly, the Commission on Sustainable Development and other relevant intergovernmental bodies, and felt that it should therefore retain its current status. In that context, the Committee recommended that its report be made available by the Secretariat to the Working Group on the Restructuring and Revitalization of the United Nations in the Economic, Social and Related Fields, which had been established by the President of the General Assembly.

15. Many of the topics discussed by the Committee, such as the efficient use of energy and materials, the development of energy resources, and energy and the protection of the atmosphere, were relevant to impending discussions of the Commission at its fourth session. The Committee felt that it had an important role to play in the consideration of energy issues for the fourth and fifth sessions of the Commission and the special session of the General Assembly to be held in 1997. The Committee also felt that it could contribute to deliberations on energy issues by other intergovernmental bodies, including the United Nations Centre on Human Settlements and the Conference of Parties to the United Nations Framework Convention on Climate Change. The Committee, therefore, recommended that its reports be made available for their consideration to the Commission on Sustainable Development, the United Nations Centre for Human Settlements, and the Conference of Parties to the Framework Convention on Climate Change.

16. At the invitation of the Chairman of the Ad Hoc Inter-sessional Working Group of the Commission on Sectoral Issues (26 February-1 March 1996), the Committee agreed that the outcome of its second session would be presented to the meeting of the Working Group by Mr. Bernard Devin. The Committee also felt that the views and recommendations contained in its report could constitute useful inputs to the deliberations of the United Nations Conference on Human Settlements (Habitat II) and of the second Conference of Parties to the United Nations Framework Convention on Climate Change.

Action taken by the Committee

17. At its 11th meeting, on 23 February, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on the follow-up to the first and special sessions of the Committee (E/C.13/1996/2) (see chap. I, sect. C).

18. For further action taken by the Committee relevant to agenda item 3, see chapter III, paragraphs. 30 and 31.

Chapter III

ENERGY AND SUSTAINABLE DEVELOPMENT

1. Access to - and therefore adequate availability of - energy services is a prerequisite to achieving the socio-economic development that is required to improve the quality of life and satisfy basic human needs, including access to jobs, food, running water, housing, health services, education and communication: energy is a source of prosperity. An adequate supply of energy is urgently needed in developing countries, and is also a prerequisite for a sustainable socio-economic development in the industrialized world and in the countries with economies in transition. A further requirement is that the supply of energy be secure and reliable. As a result, attention should be given to: (a) the dependence on imports of energy carriers from unevenly distributed energy resources; (b) the vulnerability of energy supplies to severe accidents or disruptions in the energy system or a major change in the socio-cultural environment in which such systems must operate; and (c) the exhaustion of scarce energy resources for which alternative options must be developed. To achieve the desired level of economic and social development, it is also essential that access to energy services and the supply of energy be realized at affordable costs; that the development and application of energy sources and technologies be realized in a socially acceptable manner; and that the development of energy sources create opportunities for local employment and new industrial activity.

2. The further development of the world energy system should in itself be consistent with the pursuit of sustainability: it should not endanger the quality of life of present and future generations, and should not exceed the carrying capacity of existing ecosystems. This means that the production and consumption of energy should be clean and safe. It also means that the use of scarce resources to fulfil present needs for energy services should not compromise the ability of future generations to meet their needs for the same services. This in turn requires an efficient use of resources and a timely development of alternative resources, as well as efficiency in reducing the production of wastes. Finally, it is important that the development of short-term options not hinder the development of options that in the longer term contribute better to sustainability.

3. Based on the outcomes of the Sixteenth Congress of the World Energy Council (Japan, October 1995) and publications of the United Nations system, the International Energy Agency (IEA) and other international organizations, it appears that energy supply in the world remains stable on the whole. In the developing regions, over 2 billion people have little access to commercial energy resources, which is one of the main obstacles to their social and economic development. In the countries with economies in transition, the economic crisis of the past several years has led to a decline in the demand and production of energy, resulting in lower growth of energy production in global and regional energy markets. Moreover, continuing technical progress has a positive influence on the world energy situation: it promotes relatively stable prices in energy markets; enables more efficient production, processing, transportation and use of energy carriers; and strengthens the world energy resource base. The current situation in the energy sector allows for an optimistic outlook for the future of the world energy situation, but at the same time it points to the need for increased effort by the international community in the areas of energy conservation and ensuring a secure energy supply for present and future generations. The basis of the world energy supply will remain oil, gas and coal, of which there are sufficient resources for many

decades to come; however, there is a need for greater partnership among Governments, energy businesses, international organizations and energy users to ensure a sustainable use of energy resources in view of the serious ecological concerns involved, which call for action at the national, regional and global levels.

4. As stated in chapter 9 of Agenda 21, much of the world's energy is currently produced and consumed in ways that cannot be sustained if technology remains constant and overall quantities increase substantially. Therefore, new energy strategies towards sustainability must be developed and implemented. As indicated in the report on its first session, the view of the Committee is that the main characteristics of a new energy path towards sustainability should be:

(a) A more efficient use of energy and energy-intensive materials;

(b) Increased use of renewable sources of energy;

(c) More efficient (and clean) production and use of fossil fuels;

(d) Fuel substitution from high-carbon to low-carbon and non-carbon-based fuels.

5. At its second session, under agenda item 4, "Energy and sustainable development", the Committee focused its attention and deliberations on four sub-items, based on reports of the Secretary-General: sub-item 4 (a), "Development of energy resources in developing countries", which was considered at the request of the Economic and Social Council; sub-item 4 (b), "Renewable sources of energy, with a special emphasis on biomass: progress and policies"; sub-item 4 (c), "Efficient use of energy and materials: progress and policies", a topic that calls for much more attention than it has received in the past; and sub-item 4 (d), "Energy and protection of the atmosphere", a topic that was discussed as an input to the Commission on Sustainable Development at its fourth session, at which the protection of the atmosphere will be a major agenda item. The proceedings, discussion and action taken by the Committee on each of the four sub-items are reported below.

A. Development of energy resources in developing countries

6. The Committee considered sub-item 4 (a) at its 4th, 5th and 11th meetings, on 13, 14 and 23 February.

7. The Committee had before it the report of the Secretary-General on energy exploration and development trends in developing countries (E/C.13/1996/3).

8. At the 4th meeting, on 13 February, the representative of the Energy and Natural Resources Branch, Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development, made an introductory statement.

9. At the 5th meeting, on 14 February, statements were made by Mr. P. G. Gutermuth, Mr. W. C. Turkenburg, Mr. D. Volfberg, Mr. B. Devin, Mr. W. M. Mebane, Mr. M. Boumaour, Mr. Z. Rodas Rodas, Mr. W. Hein, Mr. E. V. R. Sastry, Mr. J. L. Bozzo and Mr. Zhang Guocheng.

10. At the same meeting, representatives of WMO and the International Atomic Energy Agency (IAEA) made statements.

11. At the same meeting, the representative of UNDP made a statement.

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1. Trends and prospects

12. Energy is an essential component of economic growth and the enhancement of social welfare, and fostering sustainable development to achieve these goals will require increasing the availability of energy services, particularly in developing countries.

13. On the other hand, the relationship between economic development and the concomitant growth in energy services is very much influenced by the energy efficiency of the economy, so that an increase in per capita energy or electricity consumption has no predictive or deterministic value. It is well known that it is not energy consumption per se but policy decisions and local socio-economic and market conditions that determine the improvement of various development indicators, such as literacy rate, life expectancy and infant mortality.

14. Both commercial and non-commercial energy sources (fuelwood, animal dung etc.) are important in developing countries. Non-commercial energy supplies are becoming scarce in some regions of the world, and the demand for them is growing at about the same rate as the population, with the result that they are becoming progressively commercialized. In view of the rapidly growing energy service requirements of developing countries, all energy sources that are available on the market have a valuable contribution to make.

15. Fossil fuels will continue to play a dominant role, and in many cases their share of the energy balance of developing countries will grow; it will take a few more decades in most countries before competitive renewable energy sources can be expected to penetrate the energy market to a substantial degree.

16. Renewable sources of energy are generally environment-friendly local sources that are especially valuable for developing countries, although they depend to a great degree on local conditions. They can be used in a stand-alone mode, and in some cases are already competitive with fossil fuels. In the long run, renewable sources of energy can be expected to supply more than just basic demand in rural areas; at its special session, the Committee had in-depth discussions on this question and made a number of detailed recommendations.

17. Prospects have improved for the generation of grid-connected electricity by means of a number of renewable energy technologies, especially wind power. In India, for example, through a combination of effective fiscal and financial incentives, wind-generated electricity has made impressive gains and its capacity has exceeded 500 megawatts (MW) in the last few years, especially through private initiatives. Considerable progress has also been reported from a number of other developing countries, particularly China.

18. Fast-growing electricity needs, with an ever-widening gap between supply and demand, is prompting many countries to look into nuclear energy.

2. Suggestions for action

19. The resource base of hydropower, solar, wind and geothermal energy in many countries and some regions, including the production, distribution and consumption of these resources by a number of United Nations entities, have been assessed, and WMO has cooperated with the national agencies concerned in activities of direct or indirect relevance. The mapping of these potential energy resources should be completed and improved as far as possible.

20. Considering the critical importance of energy resources and services in the sustainable economic development of developing countries, particularly in view of possible climate change resulting from anthropogenic impacts, a careful monitoring and assessment of emerging trends in the development and use of all energy sources should be maintained, with a special emphasis on renewable energy technologies. Developing countries are urged to compile and disseminate up-to-date information and data on the status of and trends in their use of renewable energy resources (commercial and non-commercial).

21. Developing countries should continue to strive for increased efficiency at all levels of production, distribution and end-use of energy, based on an in-depth investigation of the economic and technical potential of improving energy efficiency.

22. Commercial energy supplies often continue to be provided by State-owned companies that are increasingly encountering financial problems when faced with the need for enormous investments in central supply facilities. A reliable, efficient and environmentally sound supply of energy services should be promoted, taking advantage of the services of the private sector, where possible through cooperation with non-governmental organizations.

23. The question of whether rural energy development should be promoted by either a top-down or bottom-up approach is not of significance as long as sound commercial and financial practices are in place. Government subsidies and other incentives should be allocated within a limited time-frame so that they do not lead to an inappropriate use of public resources.

24. It is imperative that not only the generation and consumption of energy but also the exploration, development and distribution of all energy resources (fossil, nuclear, renewables) be conducted in an environmentally sound and sustainable manner, using the best available practices.

25. It is especially important that regulatory and safety measures, radioactive waste management and safeguards against nuclear material proliferation be carefully reviewed and adhered to.

26. Energy research, development and demonstration should be especially encouraged if the pursuit of sustainability is to be achieved in the energy sector in the long term. Fortunately, the current status of technologies in the sector is favourable for their application in many domains.

27. The developing countries will also require increased access to and the transfer of environmentally sound energy technologies and know-how to meet their energy needs on a sustainable basis. In this process, developing countries may need international assistance in the development and enhancement of their indigenous capacities and technologies.

28. Developing countries will require substantial investments in order to meet the increasing demand for energy services and to develop and transport the energy supply, as well as to develop indigenous energy resources, fossil fuels and renewable sources of energy. Capital requirements on this scale can only be met by enhancing the mobilization of financing from national private and public sources, including end-users in some cases (in cash or in kind); increased access to international funding; foreign-direct investment; and the expansion of bilateral and multilateral assistance programmes.

29. Taking into account the critical socio-economic situation in many developing countries, important prerequisite issues concerning the development and use of energy resources should be handled by national and regional initiatives. They should serve as a platform for studying, coordinating and implementing related activities on a continuous basis, and could be further reinforced by international cooperation.

Action taken by the Committee

30. At its 11th meeting, on 23 February, the Committee had before it a draft decision (E/C.13/1996/L.6) entitled "Recommendations of the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session", which was submitted by the Chairman on the basis of informal consultations.

31. At the same meeting, the Committee adopted the draft decision (see chap. I, sect. B).

32. At its 11th meeting, on 23 February, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on energy exploration and development trends in developing countries (E/C.13/1996/3) (see chap. I, sect. C).

33. For further action taken by the Committee relevant to agenda item 4 (a), see chap. IV, paragraphs 21 and 22.

B. Renewable sources of energy, with a special emphasis on biomass: progress and policies

34. The Committee considered sub-item 4 (b) at its 6th and 11th meetings, on 14 and 23 February.

35. The Committee had before it the report of the Secretary-General on renewable sources of energy, with a special emphasis on biomass: progress and policies (E/C.13/1996/CRP.1).

36. At the 6th meeting, on 14 February 1996, the representative of the Energy and Natural Resources Branch of the Division for Sustainable Development made an introductory statement.

37. At the same meeting, statements were made by Mr. E. V. R. Sastry, Mr. D. Volfberg, Mr. W. M. Turkenburg, Mr. W. Hein, Mr. W. M. Mebane, Mr. P.-G. Gutermuth, Mr. M. Actouka, Mr. M. Boumaour, Mr. B. Devin, Mr. J. L. Bozzo, Mr. Z. Rodas Rodas and Mr. Zhang Guocheng.

38. At the same meeting, the representative of IAEA made a statement.

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39. Renewable sources of energy have been the focus of international attention for about two decades now. The United Nations Conference on New and Renewable Sources of Energy (Nairobi, 10-21 August 1981) adopted a comprehensive plan of action. Although several initiatives have been taken worldwide by Governments and international organizations, there has been a general slow-down in renewable energy development on account of the low oil prices and policies pursued in some major industrialized countries. However, there has been a perceptible resurgence of interest in renewable energy sources, chiefly due to the environmental and sustainability concerns associated with fossil fuels.

40. Different scenarios have been constructed on the contribution of renewable sources to future energy supply. Although renewables will probably contribute only a small share of world energy supply in the early part of the next century, that contribution could grow significantly in later decades. In addition, in some countries and in some situations, the importance of renewables will be much higher than their contribution to the global supply might indicate.

41. Some renewable energy technologies are now mature and are competing with conventional energy systems; several more are in promising stages of development. While it would be unrealistic to expect new sources to replace conventional sources on a large scale in the near future, there are nevertheless applications for which and locations in which the use of renewables can be strongly recommended even today, such as photovoltaic power for communications and home systems in unelectrified areas; solar heating; biogas for cooking; and small hydropower systems in remote areas.

42. The renewable sources of greatest interest continue to be solar, wind, biomass and hydropower. Geothermal energy and animal power are of interest in several countries. Various forms of ocean energy are still in limited or experimental use, but can be considered to have a future potential only, as can such potential sources as using hydrogen as an energy carrier, if it can be produced economically from renewable energy sources.

1. Biomass

43. Bioenergy remains the most important renewable energy source because of its widespread availability, diverse uses and still untapped potential. Technological developments during the last two decades have enabled biomass to be used in new and efficient ways. It is no longer just a traditional fuel, but can be considered as a modern energy source of interest to both developing and industrialized countries.

44. When produced in an efficient and sustainable manner, bio-energy has numerous environmental and social benefits, such as job creation; the use of surplus agricultural land in industrialized countries; the provision of modern energy carriers to rural communities of developing countries; improved land management; and a reduction of carbon dioxide and sulphur emissions to the atmosphere. It is important, however, to undertake a thorough evaluation of various types of biomass resources and their sustainability as energy sources. This will require the development of appropriate criteria, as well as a methodology for undertaking such an evaluation based on the criteria developed.

45. Three major social implications associated with biomass production are: (a) land and water availability; (b) food versus fuel; and (c) employment generation. Land and water availability are perceived as a constraint to the large-scale production of biomass; however, there are considerable areas that are potentially available even under current production systems. Food versus fuel is a controversial and complex issue. On a global scale, there is available land, but the potential for conflict is a real one that requires attention, as does the conflict between biomass production and water requirements. Employment opportunities have been heralded as a major advantage of biomass because of its many multiplying effects that help to strengthen the local economy, particularly in rural areas.

46. Other relevant issues are:

(a) Environmental and ecological factors;

(b) Biomass as a carbon-dioxide-neutral, low-sulphur replacement for fossil fuels;

(c) Competing uses of biomass for purposes other than energy;

(d) The difficulties of gathering good and reliable biomass energy data and efforts to improve data provision for energy planning;

(e) The detrimental health effects of biomass energy, particularly from traditional energy uses;

(f) The need to internalize the externality costs of conventional energy carriers so as to place them on more equal terms with alternative energy sources.

47. Among the various uses of biomass, the direct burning of fuelwood for cooking is the most important use in the rural areas of developing countries. In several countries, such use is tending to be unsustainable, and fuelwood is also being traded now as a commercial fuel. Improvement in the efficiency of burning can help reduce the fuelwood consumption and pressures on supply. Large programmes implemented in China, India and some other countries to promote improved wood stoves are very relevant in this connection.

48. Biogas - gas generated from anaerobic digestion of animal dung - is widely recognized as a convenient and sustainable fuel for cooking in rural homes that have the required animals. Biogas can also be used for other purposes. In addition to the use of biogas, it has several benefits for the health and environment of rural populations. There is a need to promote the wider use of this technology, taking into account the experience generated in several countries.

49. The conversion of biomass into liquid and gaseous fuels opens up several applications in agriculture, transportation and other sectors. A careful balancing of supply and utilization levels should make such conversion a sustainable option with great potential. The gasification of agricultural residues and generation of power can help in the electrification of rural areas on a decentralized basis. Municipal and industrial wastes are a source of growing importance for the production of gas and electricity; large-scale use of wastes for this purpose can also help in management of wastes in urban centres.

50. Electricity from biomass is sometimes competitive but often more expensive than that generated from fossil fuels. Advances have been made in designing and improving furnaces and boilers to burn different types of biomass. Efforts are also under way to improve steam and gas turbines and combinations thereof for achieving higher efficiencies. Biomass gasifiers, integrated with the combined cycle technology, are expected to be commercially available in the next decade.

51. Ethanol is the most common liquid fuel presently available from biomass sources. Its use for transportation on a wider scale has been hampered by international oil price trends, as well as by limitations in the availability of feed stock. Diversification of feed stocks and development of more efficient techniques of conversion and use should be pursued. Another promising option could be the production of plant oils.

52. Capital costs for biomass energy facilities are still relatively high. There is a need, therefore, to improve technologies in order to reduce costs. But it is unlikely that bioenergy technology will improve enough to be competitive with fossil fuels in the near future, particularly as long as the price of fossil fuels remains at current levels. There is also a need for demonstration plants for newer and more promising technologies.

53. Despite the overwhelming importance of biomass energy in many developing countries, planning for the management of the production, distribution and use of biomass receives inadequate attention among policy makers and energy planners. A great deal more data on all aspects of biomass production and use is required on an ongoing basis. There is also a clear need to support research and development activities. Finally, a set of policy means suited to various national situations will need to be evolved and implemented.

2. Solar energy

54. Both solar thermal and photovoltaic (PV) technologies have reached a stage of commercial production and use for many applications. Water heating is a well-established application and has been encouraged in many countries through tax incentives, financing arrangements and legislative measures. There is still a vast potential for this use in homes as well as hospitals, hotels, industry, etc. Solar cooking, distillation and drying seem to be attractive in special situations and need to be promoted on a wider scale. There is considerable scope, however, for using passive concepts in buildings to generate fuel savings.

55. Photovoltaic (PV) systems are now being widely used all over the world for powering a host of small power applications, including lighting in homes and institutions, communications, water pumping, battery charging, railway signalling etc. World annual production of photovoltaic modules is estimated at about 80 megawatts (MW) increasing at an annual rate of about 15 per cent. Although some early cost projections have not been realized, PV modules are nevertheless gradually becoming cheaper. Development in concentrator solar cells and newer thin film materials point to the possibility of reducing the cost of PV systems by about a factor of three by the turn of the century.

56. It is encouraging to note that photovoltaic products are now being manufactured in a number of industrialized as well as developing countries. Programmes adopted by national Governments and international organizations have helped expand the market. New financing arrangements are also being tried out in some countries to enable individual users to acquire PV systems.

57. Large-scale grid-connected solar-thermal power plants were established in the United States of America some years ago. While these and other installations have helped the evaluation of different approaches and promoted research and development, power production from solar energy is not economically viable at present. This application is of great interest to both developed and developing countries.

3. Wind energy

58. Wind energy systems are now being used widely for grid-connected power production. This has been made possible by appropriate legislation and a variety of fiscal incentives. Among the fastest growing programmes are those in Denmark, Germany, India, the Netherlands, Spain and the United Kingdom of Great Britain and Northern Ireland. Total installed capacity in the world is estimated at about 5,000 MW, increasing at about 20 per cent annually. A global effort to map wind resources will enable the further spread of this technology.

59. Wind power systems can be also used with back-up systems for stand-alone operations.

4. Hydropower

60. Hydropower currently supplies about 20 per cent of the world's electricity. Both large-scale hydropower and small hydro-systems continue to be of interest to the world community. There is considerable untapped potential in many parts of the world. Large-scale projects, however, seem to increasingly result in problems, such as the dislocation of human populations and the submergence of forests.

5. Main issues

61. The constraints and barriers facing renewable energy development are well known and are not new to the Committee. Progress in the removal of such constraints is slow. There is now a realization, however, that a proactive approach is required to overcome the handicaps of renewable sources. In particular, it is necessary to continue to provide subsidies and other forms of support to such sources as long as conventional sources are provided with either direct or indirect support. It is also necessary to internalize the external costs of using fossil fuels and to create a policy environment that is conducive to the use of renewable energy sources.

62. There is an imperative need to accelerate research and development on all promising approaches. This will help in early commercialization of advances made and the achievement of a more sustainable balance in national energy economies. The Committee regrets the global decline in research and development expenditures on renewable energy over the past few years: this trend is the opposite of what it should be if renewable energy sources are to be made available to the largest number of people at affordable prices.

63. There is currently a greater appreciation in international financing organizations of the role of renewable sources of energy, which must be encouraged. Such organizations should consider earmarking a portion of their funds for renewable energy projects.

Action taken by the Committee

64. At its 11th meeting, on 23 February, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on renewable sources of energy, with a special emphasis on biomass: progress and policies (E/C.13/1996/CRP.1) (see chap. I, sect. C).

65. For further action taken by the Committee relevant to agenda item 4 (b), see paragraphs 30 and 31 above.

C. Efficient use of energy and materials: progress and policies

66. The Committee considered sub-item 4 (c) at its 3rd, 4th and 11th meetings, on 13 and 23 February.

67. The Committee had before it the report of the Secretary-General on efficient use of energy and materials: progress and policies (E/C.13/1996/CRP.3).

68. At the 3rd meeting, on 13 February 1996, the representative of the Energy and Natural Resources Branch of the Division for Sustainable Development introduced the report.

69. At the same meeting, Dr. Ernst Worrell, of the Department of Science, Technology and Society, Utrecht University, the Netherlands, made a presentation on the report.

70. At the same meeting, statements were made by Mr. B. Devin, Mr. P.-G. Gutermuth, Mr. D. Volfberg, Mr. W. M. Mebane, Mr. Zhang Guocheng and Mr. W. Hein.

71. At the same meeting, the representative of the United Nations Educational, Scientific and Cultural Organization (UNESCO) made a presentation on the solar summit.

72. At the same meeting, the representatives of WMO and IAEA made statements.

73. At the same meeting, the representative of UNDP made a statement.

74. At the 4th meeting, on 13 February, the Committee heard statements by Mr. W. M. Mebane, Mr. B. Devin, Mr. D. Volfberg, Mr. V. Musatescu, Mr. W. C. Turkenburg, Mr. P.-G. Gutermuth, Mr. M. Boumaour and Mr. E. V. R. Sastry.

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1. Potentials for energy and material efficiency improvement

75. Under "business-as-usual" conditions, commercial energy consumption might grow at an estimated average rate of 2.0 per cent per year, from about 312 exajoules (EJ) 2/ in 1990 to about 570 EJ in 2020, taking into account existing trends in energy efficiency improvements. Important growing energy

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2/ One exajoule is equal to 1 x 10^{18} joules.

markets are the developing countries, especially in the industrial sector and in energy use for buildings. Energy use for transport is expected to increase globally. Direct energy consumption in agriculture, although small, will also grow in developing countries, and will remain nearly constant in the industrialized countries.

76. In the report of the Secretary-General, two scenarios are developed to reflect the different development paths for energy policies that are focused on efficiency improvement in the production and consumption of energy and materials. Under the first scenario, termed "state-of-the-art", adoption of today's state-of-the-art technology is assumed in all sectors by the year 2020. As a result, energy use will still grow but will be limited to 1.3 per cent per year, reaching about 470 EJ in 2020. The resulting savings under "business-as-usual" conditions will be 100 EJ per year by the year 2000 - 80 per cent of the present annual consumption of oil. Under the second scenario, termed "advancing technology", which assumes that some technologies not yet commercially available will be adopted, the growth of global energy use would be limited to 0.6 per cent per year, reaching about 370 EJ in 2020, with slight growth in buildings, agriculture and transport and nearly constant energy use in the industrial sector.

77. Increased material efficiency improvement, as well as energy efficiency measures, may decrease the growth rate of energy consumption to 0.2 per cent per year, resulting in an energy consumption of less than 340 EJ under the "advanced technology" scenario.

78. The technical estimates of energy efficiency improvements are based on a review of the literature. The results have been incorporated into various scenarios, with sector projections to the year 2020. The technical estimates take into consideration advances in technology, and assume a sustained or even increased level of research and development for the future. Technical estimates may be contrasted to economic ones, which include only that part of the future improvements that will have adequate economic returns. This may be compared to the market potential, which will include only those improvements that will overcome the various obstacles and actually be realized in the marketplace.

79. As demonstrated in the table, potential technical savings are substantial, and are evenly distributed among industry, buildings/services and transportation in the minimum estimate, with an average of about 30 EJ per year for each sector. If technological research and development is given higher priority, the total potential more than doubles, with industry showing the greatest potential. Agriculture has lower levels of absolute potential because of lower levels of energy consumption; however, its percentage improvements would still be significant.

80. Material production accounts for about one quarter of total global energy consumption. At several stages in the material life cycle, intervention can increase the material efficiency over the total cycle, in such ways as good housekeeping, material efficient product design, material substitution, product reuse, material recycling and quality cascading. Recycling of paper is well established in many countries and reduces pulp production. Studies estimate the technical reduction potential for some applications at 50 per cent. Experimental programmes to develop clean processes and products are developed in many countries and are also disseminated internationally, such as programmes of the European Union, the Organisation for Economic Cooperation and Development, and the United Nations Environment Programme. These programmes have indicated potentially large reductions in material losses, and have shown that the

Table. Technical potential for improvement in energy efficiency: scenario study for the year 2020

Sector	Reference energy consumption "Business-as-usual" in 2020	Potential increase of annual energy savings			
		"State-of-the-art" a/		"Advancing technology" b/	
		EJ/year	Per cent c/	EJ/year	Per cent c/
Agriculture	17	3.5	21	5.2	30
Industry	205	32	16	100	49
Buildings/services	208	35	17	70	34
Transport	140	30	21	55	40
Total	570	100	18	230	40

Source: E. Worrell and others, "Potential and policy implications of energy and material efficiency improvements," report prepared for the Division for Sustainable Development, Department for Policy Coordination and Sustainable Development of the United Nations Secretariat (January 1996).

a/ Difference between energy consumption of "business-as-usual" and "state-of-the-art" scenarios.

b/ Difference between energy used in "business as usual" and "advancing technology" scenarios.

c/ Annual energy savings as a percentage of energy consumption in "business-as-usual" scenario, for the year 2020.

substitution of process inputs can lead to increased efficiency and strongly reduced waste production.

81. Applying economic constraints, apart from technical potentials, can also identify an economic potential for efficiency improvement, which is defined as the potential savings that can be achieved at a net positive economic effect, i.e., the benefits of the measure must be greater than the costs. Investments are assumed to depreciate over the technical lifetime, at a specific discount rate. The economic potential is considerably smaller than the technical potential, and the market potential, in turn, is considerably smaller than the economic potential. It is defined as the potential savings that can be expected to be realized in practice, and is determined by investment decision criteria applied by investors under prevailing market conditions.

82. There is compelling evidence that economic potentials for energy improvements in developing countries are at least as large as those in industrialized countries. If a more balanced energy investment strategy were instituted, resulting in increased investment in energy and material efficiency and reduced investment in energy supply, both developing and industrial countries could save significant amounts of capital without sacrificing energy services.

2. Implementation barriers

83. Although there are already now many options available to improve the efficiency of energy and material production and use, many barriers are hindering the implementation of these options, including:

(a) Willingness to invest: the decision-making process for investing in the improvement of energy efficiency is shaped, like any investment, by the behaviour of individuals or of various actors within organizations. Decision-making processes in these organizations are a function of rules, procedures, business climates, corporate cultures, managers' personalities, and perceptions of energy and material efficiency;

(b) Information and transaction costs: information collection and processing consumes time and resources, which is especially difficult for small firm and individual households. Many individuals are not aware of the possibilities for buying efficient equipment, because energy is just one of many criteria in acquiring equipment. However, in many developing countries public capacity for information dissemination is lacking, indicating a need for training in these countries: education and training are essential, and are currently lacking in energy conservation planning and policy-making;

(c) Profitability barriers: there is compelling evidence that residential consumers substantially underinvest in energy efficiency, or stated differently, require high rates of return (50-80 per cent) to make such an investment. Many organizations have high hurdle rates for investments in energy efficiency, often because of limited capital availability. On the supply side of energy, however, the costs of capital are much lower, leading to imperfections in the market. When energy prices do not reflect the real costs of energy, or when the appropriate information is not available, then consumers will necessarily underinvest in energy efficiency. Energy prices - and hence the profitability of an investment - are also subject to large fluctuations; uncertainty about them, especially in the short term, seems to be an important barrier;

(d) Lack of skilled personnel: especially for households and small and medium-sized enterprises, the difficulties in installing new energy-efficient equipment compared to the simplicity of buying energy may be prohibitive. In many countries, knowledge infrastructure that is easily accessible to enterprises and households is limited;

(e) Other market barriers: these include the invisibility of energy efficiency measures and the difficulty of demonstrating and quantifying their impacts; the lack of inclusion of external costs of energy production and use in the price of energy; and the slow diffusion of innovative technology into markets. Other barriers are the non-availability of or difficulties in quickly acquiring small spare parts, as well as generally inefficient after-sale services in developing countries, where more adequate management is required.

3. Policy instruments

Energy price reform and other economic instruments

84. Markets are a powerful and fundamental force in the wide-scale implementation of energy efficiency. Subsidies that depress prices of energy provide a significant disincentive for energy efficiency. The removal of this

barrier-low energy prices is an important step towards creating an investment climate in which energy efficiency can prosper.

85. The international lending organizations have been strong proponents of energy price deregulation in developing countries. The largest hurdle to such price increases involves the impact on low-income consumers. This is a serious problem in many developing countries, since low-income urban families often spend a substantial portion of their income on energy. The main considerations are that (a) energy price deregulation is a very important step to achieving end-use energy efficiency in most developing country economies; (b) such deregulation is hardly feasible without protecting low-income consumers; and therefore (c) increased research into innovative ways to protect such consumers is needed. Direct subsidies and tax credits or other favourable tax treatments have been a traditional approach for promoting activities that are thought to be socially desirable.

86. Utility Integrated Resource Planning (IRP), which has been applied primarily in industrialized countries, is used to assess all options for meeting energy service needs, including utility-sponsored end-use efficiency programmes. IRP programmes have shown a wide variety of end-use efficiency measures that are less costly than energy supply additions. Two major problems occur: (a) how to induce the utility to carry out end-use efficiency programmes and (b) how to design such programmes so that they are in fact cost-effective. There have been many evaluations of individual utility demand side management (DSM) programmes, and most have been shown to be more cost-effective than energy supply. There has been interest in IRP and the establishment of DSM programmes in developing countries.

Regulations and guidelines

87. Regulatory programmes have proven effective in promoting energy efficiency gains. Examples include appliance energy efficiency regulations, automobile fuel economy standards, and commercial and residential building standards programmes. Energy efficiency standards are applied in many countries for various energy uses.

Voluntary agreements

88. A voluntary agreement is generally a contract between the Government (or other regular body) and a private company, association of companies or other institutions, for example to improve the energy and material efficiency. Experience with this kind of agreement has varied strongly from successful actions to failures. Voluntary agreements can have some advantages above regulation, in that they may be easier and faster to implement and may lead to more cost-effective solutions.

Information, education and audit programmes

89. Information programmes are often components of larger energy efficiency activities, so that evaluations of their effectiveness is limited. Some developing countries, such as China, Brazil, Mexico, India and Thailand, have developed large-scale information programmes to promote lighting and other energy conservation technologies, although few detailed assessments exist on the effectiveness of such efforts.

90. Audit activities are essential for providing technical identification and economic evaluation of the opportunities of energy and material efficiency

improvements. Residential energy audits performed in the United States in the 1980s have been shown to have average net savings of 3 to 5 per cent, with benefit/cost ratios between 0.9 and 2.1; similar results have been obtained in other industrial countries. Education and training for both customers and industrial energy managers offers perhaps the greatest potential for achieving long-term energy efficiency savings, especially for developing countries.

Research, development and demonstration

91. There is a consensus among economists that research and development has a payback that is higher than many other investments, and the success of directed research and development has been shown in such fields as civilian aerospace, agriculture and electronics. Research and development in energy should be prioritized with environmental policy goals. Long-term research should be protected against often more costly demonstration and commercialization initiatives.

92. There is a great need for technological innovation for energy efficiency in the developing countries. Technologies that have matured and been perfected for the scale of production, market and conditions in the industrialized countries may not be the best choice for the smaller scale of production or different operating environments that are often encountered in a developing country.

Cooperation between industrialized and developing countries

93. An important area for cooperation between the industrialized and developing countries involves the development and strengthening of local technical and policy-making capacity.

94. Energy efficiency should be viewed as an integral component of national and international development policies. Energy efficiency should also be incorporated into the planning and design processes wherever there are direct or indirect impacts on energy use, such as in the design of industrial facilities or in transportation planning.

95. Joint implementation (JI) may also be a useful energy efficiency promotion instrument. To be successful, a JI project should fit into the scope of sustainable development of the host country. Comprehensive evaluation of pilot projects is necessary to formulate and adapt such criteria, including the issue of crediting. Hence, the role of JI in the short term will be limited, but might grow in importance in coming decades.

4. Additional conclusions and suggestions

96. Improvements in energy and materials efficiency is a function of time: much greater improvements can be expected over the long term than over the short term. Nevertheless, for such improvements to become a reality, significant increases in investment for research and development will be required. Similarly, greater efforts will be needed with regard to capacity-building and education and training in developing countries.

97. A possible measure for improving energy and material efficiency is to stimulate the setting up of targets by sector, which has been a successful measure in a number of countries.

98. It is important to distinguish between requirements or policies, and the most appropriate measures for different countries or regions. A clear distinction should be made between developed countries, developing countries and countries with economies in transition. For developing countries, emphasis should be placed on overall organization of the energy efficiency efforts, the need to concentrate on economic sectors with greatest opportunities, the need to introduce more energy-efficient products and to properly maintain such products, and importantly, the need to ensure the availability of the large capital necessary for building up the energy sector, including investments in energy and material efficiency. To this end, it is necessary to have a permanent body dedicated to the promotion of energy efficiency and renewable energy, and possibly for environmental protection as well. The organizations and bodies of the United Nations system should continue and increase their activities in capacity-building in these countries, involving education and training, pilot projects, facilitating North and South cooperation in energy management, and establishing networks between agencies in each region, and should also increase their role in helping developing countries to plan for the fiscal and financial instruments that are needed to finance investments in efficiency.

99. There is also a need to establish national or international minimum standards for energy efficiency of key products, including common household appliances, home entertainment systems, space heating and cooling equipment, lighting products, office equipment, electric motors and transportation vehicles. Such standards should take into account regional differences in product characteristics, markets and the ability of the consumers to afford such measures. For the specification of such standards, it will be necessary to have some common testing procedures and definitions of product performance, which might be obtained by recommendations or agreements, building up on a regional or international basis, as appropriate. The actual method for improving the energy efficiency of such products could be through voluntary agreements with industry or the setting up of obligatory minimum standards of efficiency, for which international agreement would be appropriate and for which the organizations and bodies of the United Nations system can play an essential role in coordinating negotiations. Two important policy opportunities are relevant to the above approach. First, the idea of a standard may be extended to industrial processes in the form of energy and material benchmarking. Second, it is of crucial importance to properly maintain such equipment. Product maintenance is an area which has not received the attention it deserves. It is cost-effective, creates jobs and ensures that products are run efficiently; the United Nations system could facilitate pilot programmes to this end.

100. Another important area of policy is to promote energy and material efficiency in areas of greatest potential; for example, the industrial sector of most developing countries and the building and service sectors for most economies in transition. Appropriate measures would include support for energy audits, feasibility studies and new forms of financing such investment projects.

101. In the industrial countries, there is a need to pay more attention to transport policy measures that involve technological research, minimum efficiency standards in transport system and infrastructure modifications, territorial planning and management, and environmental maintenance policy.

102. There is also a need for developed countries to reassess energy efficiency and demand side priorities with respect to energy supply priorities. Data available indicate that many energy efficiency programmes in industrial countries are being downsized. This is an area of concern, since there has been a significant decrease in research, development and demonstration efforts.

International collaboration in which research, development and demonstration efforts among countries are aligned may be the best way to address this problem. There is also a need for industrial countries to continue to improve the involvement of traditional energy suppliers and distributors in the energy demand efficiency business. The transfer of such experiences among developed countries to other regions, particularly to developing countries, could be facilitated by international cooperation.

Action taken by the Committee

103. At its 11th meeting, on 23 February 1996, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on efficient use of energy and materials: progress and policies (E/C.13/1996/CRP.3) (see chap. I, sect. C).

104. For further action taken by the Committee relevant to agenda item 4 (c), see paragraphs 30 and 31 above.

D. Energy and the protection of the atmosphere

105. The Committee considered sub-item 4 (d) at its 7th and 11th meetings, on 15 and 23 February.

106. The Committee had before it the report of the Secretary-General on energy and protection of the atmosphere (E/C.13/1996/CRP.2).

107. At the 7th meeting, on 15 February, the representative of the Energy and Natural Resources Branch of the Division on Sustainable Development made an introductory statement.

108. At the same meeting, statements were made by Mr. B. Devin, Mr. P.-G. Gutermuth, Mr. W. Hein, Mr. E. V. R. Sastry, Mr. W. C. Turkenburg, Mr. D. Volfberg and Mr. M. K. Actouka.

109. At the same meeting, the representative of WMO made a statement.

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1. Status and trends

110. The observations and conclusions of the Committee, made on the basis of the reports of the Intergovernmental Panel on Climate Change (IPCC) and the report of the Secretary-General on energy and the protection of the atmosphere (E/C.13/1996/CRP.2), are summarized below.

111. Energy production and use is the main source of many of the threats to the Earth's atmosphere, which is affected by many interrelated anthropogenic sources of interference that can lead to environmental impacts and ultimately to irreversible changes of the climate system. Human interferences include local and regional air pollution, and increasing concentrations of greenhouse gases, aerosols and halocarbons. The combustion of fossil fuels and unsustainable uses of biomass fuels cause extensive local and regional air pollution, often resulting in acidification that damages entire ecosystems. Human activities have increased the atmospheric concentrations of many naturally occurring gases and have also added new ones.

112. Local and transboundary pollutants from energy-related activities deteriorate air quality in many urban and some rural regions throughout the world. They also result in economic and health damages and endanger ecosystems. High levels of indoor air pollution from burning low-quality biomass or coal in traditional open fireplaces are widespread in developing countries. Sulphur dioxide and nitrogen oxides emissions from fossil power plants and dense motorized traffic cause regional and transboundary air pollution that leads to the acidification of forests, lakes and soils. More recently, transboundary air pollution and increasing acidification have also become sources of concern in the rapidly developing, coal-intensive economies of East Asia.

113. Concentrations of greenhouse gases have increased significantly since the beginning of the fossil-fuel era. Atmospheric concentrations of carbon dioxide (CO_2) have increased by about 30 per cent, of methane by 150 per cent and of nitrous oxides (NO_x) by over 10 per cent. These increases in the atmospheric greenhouse gases and aerosols, taken together, are expected to result in global climate change, as reflected in, inter alia, a substantial higher mean global temperature and changes in precipitation and air currents, which could have severe impacts on soil moisture, sealevels, ocean currents etc. Such impacts, in turn, can lead to adverse ecological effects, affect human settlements and activities, and endanger sustainable development.

114. The type and extent of the environmental impacts of energy production and use are closely related to the degree of economic development and industrialization. Three classes of environmental problems are problems associated with (a) poverty, (b) industrialization and (c) affluence. Each class of problem places a different burden on the environment. Environmental problems that result from poverty include high levels of indoor and outdoor particulate air pollution; its impact is usually limited to areas close to the source of pollution. Environmental problems related to industrialization and affluence include high emissions of CO_2, NO_x and sulphur dioxide (SO_2), and high levels of hazardous municipal and industrial wastes. Problems emerge mainly in urban and industrial areas, but with increasing levels of industrialization they spread to other regions and affect many ecosystems in addition to human health.

115. Global primary energy use has increased by a factor of 20 since the middle of the nineteenth century. There is, however, a considerable variation in energy consumption growth rates over time and among different world regions. At the same time, the mix of primary energy sources has changed dramatically, and the legacy of the enormous expansion in the use of predominantly fossil fuels had also become apparent.

116. According to IPCC, the balance of evidence suggests a discernible human influence on global climate, mainly due to the anthropogenic emission of greenhouse gases. Energy is the most important single source of greenhouse gases, and contributes about two thirds of all anthropogenic sources of CO_2 emissions. The largest single source of fossil fuel carbon emissions is coal, with currently about a 43 per cent share, followed by oil with about 39 per cent and natural gas with 18 per cent. Adding non-energy uses of fossil fuels, such as industrial feedstocks, reverses the shares to 40 per cent for coal and 42 per cent for oil.

117. Industrialized countries account for about 60 per cent of current carbon dioxide emissions. They are also responsible for most of the historical emissions (about 80 per cent). Although they operate at much lower absolute levels, the emissions of developing countries are growing more rapidly than in the industrialized ones.

118. Since the onset of the industrial revolution, human activities have not only increased the atmospheric concentrations of naturally occurring greenhouse gases but have also added new ones. The anthropogenic sources of chlorofluorocarbons (CFCs) also produce a greenhouse effect. Human activities also affect the amount of aerosols in the atmosphere, which influence climate in other ways. They scatter some incoming solar radiation back to space and, thereby, cool the Earth's surface.

119. Analysis of observations of surface temperature indicates that there has been a global mean warming of 0.3 to 0.6 degrees Kelvin during the last 100 years. Unfortunately, it is not possible to reliably determine the combined effect of increasing concentrations of greenhouse gases and other effects of human activities on the climate system. According to IPCC, however, the indicated change is unlikely to be entirely natural in origin.

120. Pre-industrial carbon dioxide concentration was about 280 parts per million by volume (ppmv); today it is 358 ppmv. Since the onset of the industrial revolution, about 240 gigatons 3/ of carbon (GtC) have been released into the atmosphere by energy-related activities; the annual emission of CO_2 due to energy consumption is currently about 6 GtC.

121. What is common to all calculated paths that lead to stabilization of the CO_2 concentration in the atmosphere is that the emission of CO_2 must fall to 3 GtC or less per year by the time stabilization is achieved. Scenarios that assume stabilization levels of 450 ppmv would predict cumulative emissions between the years 1990 and 2100 of about 600 to 700 GtC, while those that assume levels of 550 ppmv would predict about 900 to 1,000 GtC.

122. Most scenarios that lead to cumulative emissions in the range of 6 to 10 GtC involve active measures for changing the structure of energy systems so as to lead to lower environmental impacts with sufficient energy for economic development.

2. Options for mitigation and adaptation

123. The most obvious option for mitigating against undesirable impacts of unabated emissions is emission reduction. Emission reductions can be achieved by efficiency improvements, by fuel switching and structural change to cleaner energy forms, and by adapting technological means of reducing pollutants from large point sources. Two further mitigation options are the enhancement of greenhouse gas sinks and adoption of adaptation measures.

124. Efficiency improvements constitute the most generic mitigation option. A more efficient provision of energy sources not only reduces the amount of primary energy required but also reduces adverse environmental impacts across all pollutants, resource use and energy costs. It is also the option that is generally considered to have the largest mitigation potential in the near future. In some respect, enhanced care against methane emissions from natural gas, oil and coal fields and from natural gas transport and use is also a measure of efficiency improvements. Because of the relatively large greenhouse effect of methane, great emphasis should be placed on reducing its emission.

125. Fuel switching options are structural shifts from emissions-intensive fossil fuels to cleaner ones. For example, switching from coal to natural gas reduces CO_2 emissions per energy unit by about 40 per cent, while also reducing

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3/ One gigaton is equal to 1 billion tons.

particulate and sulphur dioxide emissions that are important local and regional pollutants.

126. Structural change is an option that involves increasing the share of carbon-free energy sources, such as hydro, solar, wind, geothermal and nuclear sources, or towards sources that are carbon-neutral with respect to the atmosphere, such as the sustainable use of biomass. While the Committee strongly recommends the sustainable use and implementation of hydro, solar, wind, geothermal and biomass, when referring to the nuclear option it is of the view that the use of current technology is connected with significant risks and substantial investment costs. The Committee therefore gives no recommendation at present on the wider use of nuclear energy.

127. Reducing emissions from large point sources: the separation and storage of CO_2 from large power plants fired by fossil fuels can be an option if its costs and environmental impact can be maintained below acceptable levels. CO_2 recovery from coal gasification combined cycle power plants, and storage of recovered CO_2 in deep aquifers or depleted natural gas fields seem viable options for the near future. Another option is the production of hydrogen from natural gas and the storage of the by-product CO_2 in (nearly) exhausted gas fields.

128. Enhancement of sinks is limited as a mitigation option to greenhouse gases that are absorbed by natural sinks, as is the case with carbon dioxide. A viable option is afforestation as demonstrated in a number of projects and programmes, amongst others, by power companies.

129. Adaptation options are meant not to protect the atmosphere but rather to minimize the adverse effects of possible environmental changes due to human interference with the climate system. They are related to the inertia of the climate system, including the cumulative nature of anthropogenic emissions; the long lead times required between the political negotiation process, policy actions and the resulting reductions in emissions, and the significant time-lags between stabilization of atmospheric concentrations and eventual climate stabilization. There are large disparities in the capacity to mitigate and adapt to environmental changes from energy production and use among different regions and countries, with the developed countries most well-placed.

130. Developing countries face a number of challenges:

(a) Their historical and current contributions to energy-related global environmental stress is low but is expected to increase in the future. This will take several decades, however, and therefore raises questions about the nature of their responsibility;

(b) Developing countries have a much higher vulnerability to possible climate change, particularly small island developing nations, which could face annihilation;

(c) The adaptation possibilities of many developing countries are more limited because of low national incomes, resulting in low research and development budgets, severe capital scarcities and limited institutional capacities for dealing with climate change.

3. Policy instruments

131. There are a number of policy instrument measures that raise both public and private awareness, and that help to reduce the significant scientific and policy uncertainties involved, especially when dealing with long-term sustainable development criteria and environmental issues. Public awareness is critical for promoting a favourable social context and acceptance for the implementation of the numerous measures necessary for moving societies along environmentally sustainable development pathways.

132. To achieve the seemingly conflicting objectives of providing better and more energy services while avoiding harmful environmental side-effects, a high priority must be given to efficiency improvements. Such improvements - even using existing plants and equipment - are substantial and can be achieved relatively quickly.

133. There are also a number of market and non-market instruments. Market instruments include taxes, fees, tax exemptions, subsidies, tradeable permits, polluter pays principles and the internalization of environmental externalities. Non-market instruments include information, advertisements, education, standards, and legal and institutional regulations, bans and controls. Most of these market and non-market instruments may work in both directions, removing or establishing barriers, and promoting or hampering progress.

134. Policy instruments need to take into account regional differences in the levels of human development and the resulting social and development imperatives, levels of resource endowments, and economic and technological vintage structures. Developing countries have their own constraints in establishing and using policy instruments, chief among which is a lack of capital.

135. One special problem is the variation of general technology-related knowledge, experience and skills among regions and countries. The level of endowment of know-how and know-why that is required to induce the development, import and adaptation of new technologies in developing countries often lags behind that of developed countries. There is need for reliable, impartial information on available technologies, including detailed descriptions. Much of the information available on mitigation options and implementation instruments is tailored to needs and situations in developed countries, and is hence of limited use in the developing countries.

136. Technology appropriateness is also an issue that must be specifically addressed. The industrialized countries also need to provide for initial niche markets for new environmentally benign technologies in order that learning curve effects and associated cost reductions are exploited to a maximum before technologies are transferred to the developing countries. The Committee recommends, for both developed and developing countries, the establishment of special "ecozones" for promotion and further development of environmentally friendly energy technologies. The Committee also strongly recommends the encouragement of local production of energy-saving equipment and renewable energy technology. International cooperation is recommended both to establish and to enforce standards for emissions.

137. There is a need to monitor and evaluate the present status of implementation of policy measures and instruments for controlling anthropogenic impacts, as well as to determine how effective such measures are.

138. The Committee believes that if concerted and strong action is taken on a continuing basis, it will be possible to reduce the annual CO_2 emission to below 3 GtC by the year 2100, and to hold the cumulative CO_2 emissions between 1990 and 2100 to below 600 GtC through a combination of measures that are already under way in relation to efficiency improvements, possible advances in technology and specific measures along the lines mentioned above.

Action taken by the Committee

139. At its 11th meeting, on 23 February, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on energy and protection of the atmosphere (E/C.13/1996/CRP.2) (see chap. I, sect. C).

140. For other action taken by the Committee relevant to item 4 (d), see paragraphs 30 and 31 above.

Chapter IV

MEDIUM-TERM PLANNING AND COORDINATION IN ENERGY

1. The Committee considered item 5 at its 8th, 9th and 11th meetings, on 15 and 23 February.

2. The Committee had before it the report of the Secretary-General on energy activities of the United Nations system (E/C.13/1996/7).

3. At the 8th meeting, on 15 February, the Director of the Division on Sustainable Development made an introductory statement.

4. At the same meeting, statements were made by Mr. W. C. Turkenburg, Mr. P.-G. Gutermuth, Mr. V. Musatescu, Mr. B. Devin, Mr. D. Volfberg, Mr. Zhang Guocheng, Mr. E. V. R. Sastry and Mr. W. Hein.

5. At the same meeting, the representatives of WMO and IAEA made statements.

6. At the 9th meeting, on 15 February, statements were made by Mr. W. C. Turkenberg, Mr. M. Boumaour, Mr. D. Volfberg and Mr. B. Devin.

7. At the same meeting, a representative of the Department for Development Support and Management Services made a statement.

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8. A review of the programmes of the United Nations system operating in the field of energy indicated that, in accordance with the mandates of their respective governing bodies, they were involved in a wide range of activities related to energy development and use, including new and renewable sources of energy; electricity generation and use; energy efficiency; management; the generation of financial resources and investments; the strengthening of institutions; and capacity-building. Some of these activities were global in scope, others were being carried out at the regional and national levels; only a limited number of them addressed energy assessment and planning.

9. The Committee emphasized the need to accord the highest priority to the formulation and implementation of activities and programmes concerned with the promotion of energy efficiency, and noted that a number of organizations were dealing with the conservation and efficient utilizations of energy resources at both the national and regional levels. Examples of such activities are the joint World Bank/UNDP Energy Sector Management and Assessment Programme and the Regional Efficiency 2000 project initiated by the Economic Commission for Europe. Such activities might be strengthened by launching a World energy and material efficiency initiative comparable to the World Bank Solar Initiative. In addition, the Committee recommended that the organizations of the United Nations system address the need to develop a generally accepted methodology for the international comparison of energy efficiencies in its various uses.

10. The Committee noted with satisfaction that the recommendations of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, which was adopted by the United Nations Conference on New and Renewable Sources of Energy (Nairobi, 10-21 August 1981), had generated a wide range of activities and enhanced awareness about the importance of energy resources. In particular, the Committee took note of activities for

enhancing the transfer of technology and technical cooperation among developing countries.

11. The Committee was informed of the progress of the world solar summit process initiated by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Committee noted that a meeting of the World Solar Commission and a meeting of the summit was scheduled for September 1996 in Harare.

12. In spite of the growing importance of the use of energy in the transport sector and of issues related to the transport of energy, the Committee noted that the planning of activities within the United Nations system dealing with such questions was insufficient, and recommended that relevant organizations increase their efforts to address them.

13. The Committee noted the continued role played by the World Bank and UNDP in the financing of energy projects, both for conventional and new and renewable sources of energy. It also took note of the increasing role being played by the Global Environment Facility in the funding of energy projects that involved environmentally sound technologies. The Committee regretted, however, that the level of commitment from the international community, including multilateral and bilateral donors as well as efforts in developing countries themselves, appeared to have been declining in recent years.

14. The availability of and access to information concerning the assessment, development and utilization of energy resources were essential for the formulation and implementation of energy policies. There was a need for a coordinated development and proper management of databases on various aspects of energy, taking into account their dynamic nature. The Committee noted that while a number of databases existed dealing with various aspects of energy resources, systematic access to them remained difficult. There was a need to promote the creation of an efficient electronic network aimed at linking existing databases. The Committee also wished to emphasize the importance of the collection, processing and dissemination of data on issues related to the role of women in the development, utilization and management of energy resources.

15. The report of the Secretary-General and an accompanying background document containing a listing of activities had provided a great deal of useful information. However, the Committee noted that the information was not complete and did not allow for an evaluation of the relative importance of programmes of different organizations or an evaluation of trends in terms of the scope and magnitude of programmes over time. Consequently, the Committee stressed the need to establish a systematic database on programmes and activities of the organizations of the United Nations system in a form that was accessible for public information, using modern electronic communication techniques.

16. The Committee noted that a considerable amount of coordination existed among agencies in dealing with specific topics and sectoral programmes. The Energy Efficiency 2000 programme, ESMAP, FINESSE, the Database and Methodologies for Comparative Assessment of Different Energy Sources of Electricity generation (DECADES), and the impressive work of the IPCC were examples of such cooperation. An important tool for enhancing cooperation on a regional scale would be the establishment of an energy charter such as had been accomplished in Europe, which in one form or another might also be valuable in other regions.

17. The Committee was of the view, however, that the organizations of the United Nations system lacked a holistic and concerted approach to the assessment, development, utilization and management of energy resources. Efforts to bring about such a concerted approach to energy activities among the organizations of the United Nations system should be strengthened; hence, preference should be given to the development of integrated programmes rather than single projects.

18. Accordingly, the Committee recommended that the Secretary-General be invited to look into possibilities for strengthening coordination in the field of energy among the organizations and bodies of the United Nations system in the context of the Administrative Committee on Coordination (ACC), perhaps through an appropriate ACC subcommittee. The Committee noted the suggestion made in the report of the Secretary-General to include an energy item in the agenda of the Inter-agency Committee on Sustainable Development.

19. The Committee on New and Renewable Sources of Energy and on Energy for Development wished to reiterate the view expressed at its first and special sessions that it was necessary to study in-depth ways and means of strengthening institutional arrangements within the United Nations system in the energy field, including the possible establishment of a dedicated institution. The Committee recommended that the possibility of achieving that objective, perhaps through the expansion of the terms of reference of an existing organization, be examined. The Committee was informed that the implementation of such a recommendation would have programme budget implications that would be submitted to the Economic and Social Council on its consideration of the recommendation for its adoption. The Committee also recommended that the possibility be investigated of strengthening the energy activities of the organizations and bodies of the United Nations system by streamlining their mandates.

20. In view of the critical importance of energy development and utilization, the Committee was of the view that there was an urgent need to strengthen efforts to increase public awareness and seek new paths towards anchoring energy in the sustainable development process. The Committee believed that the convening of a United Nations conference on energy for the twenty-first century would be an important vehicle for achieving such objectives, and could be envisaged for the year 2001, 20 years after the first Conference.

Action taken by the Commission

21. At the 11th meeting, on 23 February, the Committee had before it a draft resolution (E/C.13/1996/L.3) entitled "Proposal for a United Nations conference on energy for the twenty-first century", submitted by the Chairman on the basis of informal consultations.

22. At the same meeting, the Committee adopted the draft resolution (see chap. I, sect. A).

23. At the 11th meeting, on 23 February, the Committee had before it a draft resolution (E/C.13/1996/L.4) entitled "Coordination of the activities of the organization of the United Nations system in the field of energy", submitted by the Chairman on the basis of informal consultations.

24. At the same meeting, the Committee adopted the draft resolution (see chap. I, sect. A).

25. At its 11th meeting, on 23 February, on the proposal of the Chairman, the Committee decided to take note of the report of the Secretary-General on energy activities of the United Nations system (E/C.13/1996/7) (see chap. I, sect. C).

26. For other action taken by the Committee relevant to agenda item 5, see chapter III, paragraphs 30 and 31.

Chapter V

OTHER MATTERS

1. The Committee considered item 6 at its 10th meeting, on 21 February.

2. At the same meeting, the representative of the United Nations Educational, Scientific and Cultural Organization made a presentation on the World Solar Summit.

3. At the same meeting, statements were made by Mr. B. Devin, Mr. D. Volfberg, Mr. P.-G. Gutermuth, Mr. W. M. Mebane, Mr. M. Boumaour, Mr. Zhang Guocheng, Mr. W. C. Turkenburg and Mr. M. Al-Ramadhan.

Chapter VI

PROVISIONAL AGENDA FOR THE THIRD SESSION OF THE COMMITTEE

1. The Committee considered item 7 at its 10th and 11th meetings, on 21 and 23 February. It had before it the draft provisional agenda for its third session (E/C.13/1996/L.5).

2. At the 10th meeting, on 21 February, statements were made by Mr. P.-G. Gutermuth, Mr. B. Devin, Mr. D. Volfberg, Mr. M. Boumaour, Mr. W. Hein, Mr. Z. Rodas Rodas and Mr. V. Musatescu.

3. At the 11th meeting, on 23 February, the Committee decided to approve the provisional agenda and documentation for its third session (see chap. I, sect. B).

Chapter VII

ADOPTION OF THE REPORT OF THE COMMITTEE ON ITS SECOND SESSION

At its 11th meeting, on 23 February, the Committee adopted the report on its second session (E/C.13/1996/L.2 and Add.1-7).

Chapter VIII

ORGANIZATION OF THE SESSION

A. Opening and duration of the session

1. The Committee on New and Renewable Sources of Energy and on Energy for Development held its second session at United Nations Headquarters from 12 to 23 February 1996. The Committee held 11 meetings (1st to 11th) and a number of informal meetings.

2. The session was opened by the temporary Chairman, Mr. Wilhelmus C. Turkenburg (Netherlands).

3. At the 1st meeting, on 12 February, the Under-Secretary-General for Policy Coordination and Sustainable Development made an introductory statement. He welcomed all the participants to the meeting, and informed them that due to the financial crisis facing the United Nations the possibility of postponing the second session of the Committee had been considered. A number of factors, however, had mitigated against such a move.

4. First, the Committee had demonstrated a commendable initiative in convening a special session on energy and rural development that had produced a number of valuable recommendations, which were discussed by the Commission on Sustainable Development at its third session during its consideration of chapter 14 of Agenda 21 (Promoting sustainable agriculture and rural development).

5. The second factor was the timely initiative of the convening of an international seminar on the theme "Decentralized rural electrification" (Marrakech, Morocco, November 1995). The seminar had made a number of recommendations for the attention of the Commission, in its capacity as a key actor in mobilizing development programmes, on changing the scale and pace of decentralized electrification process in rural areas; those recommendations would be formally presented to the Commission for its consideration.

6. Third, a number of agenda items for the second session of the Committee covered topics, such as efficient use of energy and materials, and energy and protection of the atmosphere, that would be directly relevant to topics to be considered by the Commission at its fourth session, in particular protection of the atmosphere and changing production and consumption patterns. The Committee's deliberations, therefore, would provide valuable input on those issues to the deliberations of the Commission.

7. Finally, the Committee was the only body in the United Nations that dealt with all aspects of energy issues in a holistic manner. As a result, it would provide useful inputs and would make an effective contribution to the consideration of energy issues by the Commission at its fourth session and by the General Assembly at its special session, in 1997.

8. The Under-Secretary-General noted that, due to cut-backs necessitated by the financial crisis, the Secretariat had been unable to produce a number of the documents for the second session in all the official languages, and he apologized for any inconvenience that might have resulted.

B. Attendance

9. The following experts of the Committee attended the session: Mr. Marcelino K. Actouka, Mr. Mohammad Al-Ramadhan, Mr. Messaoud Boumaour, Mr. José Lorenzo Bozzo, Mr. Bernard Devin, Mr. Paul-Georg Gutermuth, Mr. Wolfgang Hein, Mr. Virgil Musatescu, Mr. Valeri Andreev Nikov, Mr. William M. Mebane, Mr. Zoilo Rodas Rodas, Mr. E. V. R. Sastry, Mr. Wilhelmus C. Turkenburg, Mr. Dmitri B. Volfberg, Mr. Zhang Guocheng.

10. The following States Members of the United Nations were represented: Czech Republic, Mexico, Netherlands.

11. The following United Nations bodies and programmes were represented: United Nations Development Programme, International Research and Training Institute for the Advancement of Women.

12. The following specialized agencies were represented: United Nations Educational, Scientific and Cultural Organization, World Meteorological Organization, International Atomic Energy Agency.

13. The following non-governmental organizations in consultative status with the Economic and Social Council were represented: International Chamber of Commerce (category I), Solar Cookers International (Roster).

C. Election of officers

14. At its 1st meeting, on 12 February, the Committee elected Mr. E. V. R. Sastry (India) as Chairman by acclamation.

15. At its 2nd meeting, on 12 February, the Committee elected the following officers by acclamation:

Vice-Chairmen: Mr. Messaoud Boumaour (Algeria)

Mr. José Lorenzo Bozzo (Uruguay)

Mr. Dmitri B. Volfberg (Russian Federation)

Rapporteur: Mr. Wilhelmus C. Turkenburg (Netherlands)

D. Agenda

16. At its 1st meeting, on 12 February, the Committee adopted the provisional agenda for the second session, as contained in document E/C.13/1996/1. The agenda was as follows:

1. Election of officers.

2. Adoption of the agenda and organization of work.

3. Follow-up to the first and special sessions of the Committee.

4. Energy and sustainable development:

   (a) Development of energy resources in developing countries;

(b) Renewable sources of energy, with a special emphasis on biomass: progress and policies;

(c) Efficient use of energy and materials: progress and policies;

(d) Energy and the protection of the atmosphere.

5. Medium-term planning and coordination in energy.

6. Other matters.

7. Provisional agenda for the third session of the Committee.

8. Adoption of the report of the Committee on its second session.

17. At the same meeting, the Chairman proposed a correction to the organization of work, as contained in document E/C.13/1996/L.1, namely, to add a subparagraph (d) to item 4, to read "(d) Energy and protection of the atmosphere". The Committee then adopted its organization of work, as orally corrected.

E. Documentation

18. The documents before the Commission at its second session are listed in the annex.

Annex

DOCUMENTS BEFORE THE COMMISSION AT ITS SECOND SESSION

Document number	Agenda item	Title or description
E/C.13/1996/1	2	Provisional agenda and annotations
E/C.13/1996/2	3	Report of the Secretary-General on follow-up to the first and special sessions of the Committee
E/C.13/1996/3	4 (a)	Report of the Secretary-General on energy exploration and development trends in developing countries
E/C.13/1996/4, 5 and 6		Not issued
E/C.13/1996/7	5	Report of the Secretary-General on energy activities of the United Nations system
E/C.13/1996/CRP.1	4 (b)	Report of the Secretary-General on renewable sources of energy, with a special emphasis on biomass: progress and policies
E/C.13/1996/CRP.2	4 (d)	Report of the Secretary-General on energy and protection of the atmosphere
E/C.13/1996/CRP.3	4 (c)	Report of the Secretary-General on efficient use of energy and materials: progress and policies
E/C.13/1996/L.1	2	Organization of the work of the session: note by the Secretariat
E/C.13/1996/L.2 and Add.1-7	8	Draft report of the Committee
E/C.13/1996/L.3	4 (a), 5	Proposal for a United Nations conference on energy for the twenty-first century: draft resolution
E/C.13/1996/L.4	5	Coordination of the activities of the organizations of the United Nations system in the field of energy: draft resolution
E/C.13/1996/L.5	7	Provisional agenda for the third session of the Committee: draft decision
E/C.13/1996/L.6	3, 4 (a), (b), (c), 5	Recommendations of the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session: draft decision